Space Weather Forecast

Issued on Thursday 6 February 2025 at 00:19 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of glancing blows from two coronal mass ejections. Higher confidence for coronal hole arrival day 4. Further Moderate-class flares expected, slight chance of a Strong-class flare.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was moderate over the past 24 hours, with two Moderate-class flares. These originated from two regions within a broad cluster of five active regions transiting the northwest quadrant.

There are currently up to nine active regions on the Earth-facing disc. The majority of the activity is from the broad cluster of sunspots mentioned above. The largest individual region within these is at the rear, with most of the activity arising from that portion. It has two delta configurations within its intermediate and trailer spots, with north-south shear evident, although these spots are showing a slight decaying and splitting trend. The remaining spots are all small and simple.

No Earth directed coronal mass ejections (CMEs) were observed in available imagery in the past 24 hours. However, there is a low chance of a glancing blow from a southwest filament eruption from early 05 Feb.

Solar Wind / Geomagnetic Activity: Solar winds, showed a generally flat trend ranging between slightly elevated and slow-ambient. The Interplanetary Magnetic Field was mostly weak. The north-south component varied weakly. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Moderate activity is forecast, with Moderate-class flares expected at times and a slight chance of isolated Strong-class flares, primarily from the regions in the northwest quadrant.

Solar Wind / Geomagnetic Activity: Two CMEs feature in the forecast, one from 02 Feb which may give a glancing blow with Earth on the morning of day 1 (06 Feb). Another from a filament eruption in the southwest from early on 05 Feb, which has a low chance for a glancing blow late

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day 2 or day 3 (07/08 Feb). Both are low confidence. The potential for further CMEs and hidden transients is currently elevated.

Solar wind speeds are expected to be background to slightly elevated for much of the period, although could perhaps return to slightly elevated to elevated levels should either of the two CMEs arrive. The next recurrent feature will be a high speed stream of solar wind. This is expected to most likely arrive at Earth on 09 Feb, although there is a chance it may become geoeffective later day 3 (08 Feb).

Generally Quiet to Unsettled (Kp 0-3) geomagnetic activity is expected for much of the period. However, there is a chance following any potential CME arrival early day 1, and perhaps a slight chance late day 2 into day 3, of seeing activity temporarily increase to G1-G2/Minor-Moderate Geomagnetic Storm intervals (Kp 5-6). Also, later day 3 there is a slight chance for G1/Minor Storm conditions to develop should the next high speed stream arrive, although this is more likely into day 4 (09 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a slightly increased risk of a rise through this period as the cluster of sunspots in the north move further across the western hemisphere.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	10	20	40
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	80	80	80
Very Active	R3-R5 (X Class)	No	20	20	20	20

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	25	25	25
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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